

Durham Research Online

Deposited in DRO:

03 May 2013

Version of attached file:

Accepted Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Corriveau, K. and Harris, P.L. and Meins, E. and Fernyhough, C. and Arnott, B. and Elliott, L. and Liddle, B. and Hearn, A. and Vittorini, L. and De Rosnay, M. (2009) 'Young children's trust in their mothers' claims : longitudinal links with attachment security in infancy.', *Child development.*, 80 (3). pp. 750-761.

Further information on publisher's website:

<http://dx.doi.org/10.1111/j.1467-8624.2009.01295.x>

Publisher's copyright statement:

The definitive version is available at <http://www3.interscience.wiley.com>.

Additional information:

Use policy

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a [link](#) is made to the metadata record in DRO
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

Please consult the [full DRO policy](#) for further details.

Young children's trust in their mother's claims:
Longitudinal links with attachment security in infancy

Kathleen H. Corriveau, Paul L. Harris,

Harvard University

Elizabeth Meins, Charles Fernyhough, Bronia Arnott, Lorna Elliott, Beth Liddle,

Alexandra Hearn, Lucia Vittorini

Durham University

&

Marc de Rosnay

University of Sydney

Abstract

In a longitudinal study of attachment, children ($N=147$) aged 50 and 61 months heard their mother and a stranger make conflicting claims across three different tasks. In two of the tasks, the available perceptual cues were equally consistent with either person's claim, but children generally accepted the mother's claims over those of the stranger. In a third task, most of the available perceptual cues favored the stranger's claims, and children generally accepted her claims over those of the mother. However, the pattern of responding across the three tasks was moderated by children's attachment status. The strategy of relying on either the mother or the stranger, depending on the available perceptual cues, was especially evident among secure children. By contrast, insecure-avoidant children displayed less reliance on their mother's claims, irrespective of the available cues, whereas insecure-resistant children displayed more.

Young children's trust in their mother's claims: Longitudinal links with attachment security in infancy

In learning about new objects and situations, children often make their own autonomous judgments based on the available perceptual cues (Piaget, 1952, 1954). When such perceptual cues are inaccessible, children can turn to other people for guidance (Harris & Koenig, 2006). However, children also encounter situations in which both sources of information are available. For example, in categorizing an unfamiliar or ambiguous object, children can register its perceptual features but they can also be provided with a category name by an adult. To draw conclusions about the identity and properties of the object children need to weigh each of these two sources of information (Jaswal, 2004). The study of children's judgment in such cases offers an opportunity to forge links between two areas of development, notably cognitive and social-emotional development, that are often studied separately but can be fruitfully combined (Olson & Dweck, 2008; Tamis-LeMonda, Adolph, Lobo, Karasik, Ishak & Dimitropoulou, 2008)

We presented preschool children with unfamiliar or ambiguous objects that were given conflicting names by the child's mother and a stranger. We asked whether children were more likely to accept information provided by a familiar informant such as their mother rather than a stranger, and whether that preference was tempered when the information supplied by their mother conflicted with the available perceptual cues. To assess whether there is a universal preference for information supplied by the mother, children in each of the four classic attachment categories, avoidant, secure, resistant, and disorganized were assessed (Ainsworth, Blehar, Waters, & Wall, 1978; Main & Solomon, 1986, 1990). Below, we review pertinent research on the early development of

information-seeking. We then discuss ways in which children's trust varies across informants. Finally, we consider ways in which children's trust in the information supplied by their mother might depend on their attachment status.

Social referencing is a key example of the way that infants turn to other people for guidance and information (Feinman, 1992). Particularly when faced with a perceptually ambiguous situation, infants look toward an available adult and depending on whether the adult offers positive or negative signals, they approach or avoid the situation in question (Sorce, Emde, Campos & Klinnert, 1985; Tamis-LeMonda et al., 2008). Although this phenomenon is well-established, two issues remain unresolved. First, as Baldwin and Moses (1996) point out, the infant's intent in referencing the adult cannot be established with certainty. An infant's looks toward an adult could be construed either as a bid for reassurance in the face of threat or emotional uncertainty or alternatively as information-seeking in the face of perceptual ambiguity. Second, it is unclear how far an infant's relationship to the adult influences the likelihood of referencing that adult.

In light of attachment theory, it is plausible to expect that social referencing is primarily a bid for emotional reassurance in the face of threat or emotional uncertainty, and will generally be directed toward a familiar attachment figure rather than toward a stranger (Ainsworth, 1992). In line with this expectation, infants who were exposed to an uncertainty-provoking object (a toy spider) were more influenced in their approach to the toy by the mother's expressive signals as compared to those of a stranger (Zarbatany & Lamb, 1985). However, if infants also seek information and not just emotional reassurance from adults, it is plausible that they will accept information from either a familiar or an unfamiliar adult, depending on their availability. In line with this second

possibility, 18-month-old infants who saw a demonstration of how to use a novel object were quicker to touch the object and more likely to copy the demonstration if they saw a stranger express approval rather than disapproval of the demonstration (Repacholi & Meltzoff, 2007). Thus, these 18-month-olds learned about an unfamiliar object by monitoring the signals of a stranger. Moreover, they learned from those signals via a type of informational 'eavesdropping' because the signals had been expressed toward the demonstration. They were not intended to offer emotional reassurance to the infants.

Whatever the exact nature of social referencing during infancy, recent research suggests that even when they are engaged in pure information-seeking, preschool children prefer to turn to a familiar adult as opposed to a stranger when both types of informant are available. For example, when 3-, 4-, and 5-year-olds watched a video in which they were shown novel objects, all three age groups preferred to ask for information about the names of the objects from a familiar rather than an unfamiliar preschool teacher. Moreover, when the two teachers provided conflicting names for an object, children preferred to endorse the name provided by the familiar teacher. Similar results emerged for object functions. When children were shown unfamiliar objects, they preferred to seek and accept information about their functions from the familiar rather than the unfamiliar preschool teacher (Corriveau & Harris, in press, a). Children also prefer to seek and accept information from apparently knowledgeable informants rather than those who signal ignorance (Koenig & Harris, 2005; Sabbagh & Baldwin, 2001).

Granted that children prefer familiar and knowledgeable informants, to what extent does the nature of a child's relationship with a given informant moderate their trust in him or her? Particularly when the informant is a caregiver, the nature of the child's

attachment might influence the child's trust in that person as an informant (Fonagy, Gergely & Target, 2007). The present study tested this hypothesis by asking whether preschoolers' reliance on information supplied by their mother as compared to a stranger varies as a function of mother–infant attachment security (Ainsworth et al., 1978). For reasons expanded on below, we anticipated that children who had been securely attached in infancy would display a flexible strategy, accepting claims made by their mother or by the stranger, as appropriate. By contrast, we anticipated that children previously classified as insecure would be less flexible, with insecure-avoidant children withholding trust in their mother and insecure-resistant children withholding trust in the stranger. Below, we describe the three tasks that were used to assess children's trust. We then consider how children's reliance on the mother as compared to the stranger might vary across the three tasks. Finally, we discuss in detail how that pattern might vary with attachment status.

As part of a larger, ongoing longitudinal study, children were available for testing at both 50 months and 61 months. At 50 months, children were shown a set of novel objects and asked to determine either the name or function of each. In line with previous studies of children's selective trust, children could choose between two informants (Koenig & Harris, 2005; Pasquini, Corriveau, Koenig & Harris, 2007). In *Ask* questions, children were invited to indicate whether they wished to ask their mother or a stranger for information about the novel object. In *Endorse* questions, having heard their mother and the stranger make conflicting claims, children were invited to say whose judgment they agreed with. In this task, the objects were completely unfamiliar. Thus, children had to choose between the conflicting claims of mother and stranger in the absence of perceptual cues supporting one claim over the other.

At 61 months, children were re-tested in order to both confirm and extend the pattern observed at 50 months. They completed two further object naming tasks involving unfamiliar stimuli. The objects in question were animal hybrids, similar to those used by Jaswal (2004) and Jaswal and Markman (2007). One task (50-50 Hybrids) was similar to the task administered at 50 months in that the perceptual evidence did not support one claim over the other. For example, a hybrid might be 50% cow and 50% horse (see Figure 1). The other task (75-25 Hybrids) was different in that the perceptual evidence favored the stranger's claim over that of the mother. For example, a hybrid might be 75% bird and 25% fish (see Figure 2). The child's mother always provided the label accounting for 25% of the hybrid (e.g., "fish") whereas the stranger provided the label accounting for 75% of the hybrid (e.g., "bird").

We predicted that children's trust in the claims made by the mother as compared to the stranger would vary across the three tasks. More specifically, in the absence of perceptual cues favoring the claims of the stranger over those of the mother (i.e., in both the Novel Objects task at 50 months and the 50-50 Hybrids task at 61 months), we predicted that children would display more trust in the mother's claims as compared to those of the stranger. By contrast, in the presence of perceptual cues favoring the stranger's claims over the mother's (i.e., in the 75-25 Hybrids task), we predicted that children would display more trust in the stranger's claims than in those of the mother.

We further anticipated, however, that children's pattern of trust would vary with attachment status. More specifically, we expected that the balance between trust in the mother's claims versus those of the stranger would vary depending on the child's previous attachment security. Children who are securely attached use the caregiver as a

secure base from which to explore, actively involving the caregiver in their interactions with objects (Ainsworth et al., 1978). Caregivers of securely attached children are likely to interpret what their infants think and feel accurately (Meins, Fernyhough, Fradley, & Tuckey, 2001). Moreover, these qualities are also apparent when mothers serve as informants. Thus, mothers of securely attached preschoolers adopt more sensitive strategies in tutoring their children on a complicated task, demonstrating an ability to alter the level of specificity of their instructions throughout the task according to how well the child is performing (Meins, 1997).

Attachment security has also been found to relate to the child's subsequent resilience and "ego strength". For example, when seeing attractive toys inside a box that was difficult to open, 3-year-olds previously classified as securely attached tried hard to open the box and took a variety of approaches to the problem (Sroufe, Egeland, Carlson & Collins, 2005). Similarly, Lütkenhaus, Grossmann, and Grossmann (1985) reported that 3-year-olds who were securely attached in infancy were more likely to employ all available resources in order to avoid losing a competitive game, whereas children who had previously been classified as insecurely attached were more likely to give up in the face of imminent failure.

Children who are classified as insecure-avoidant typically explore the environment independently and avoid interaction with the caregiver (Ainsworth et al., 1978). Interestingly, they often show less avoidance of an unfamiliar, female experimenter than they do of the mother (Ainsworth et al., 1978). Thus, children who adopt the insecure-avoidant strategy are characterized by a downplaying of the

attachment figure's importance coupled with high levels of self-reliance and autonomy (Bretherton, Ridgeway & Cassidy, 1990).

Finally, infants falling into the insecure-resistant category are preoccupied with the caregiver to the detriment of independent and collaborative exploration of the environment (Ainsworth et al., 1978). These infants typically reject the friendly play advances of an unfamiliar, female experimenter. They stay close to the mother and vigilantly monitor her behavior. Thus, insecure-resistant children are dependent on signals provided by their caregivers, with poor expectations of their own ability to deal with new situations and demands without guidance from the attachment figure (Green, Stanley, Smith & Goldwyn, 2000).

For securely attached children, the combination of using the caregiver as a secure base, together with greater resilience and "ego strength" when engaged in independent problem-solving, led us to predict that they would display a flexible pattern of trust in information provided by the mother, well-calibrated to the availability of conflicting perceptual cues. Thus, trust in the mother's claims versus those of a stranger should be strong in cases where the perceptual appearance of the object is equally consistent with either claim. Hence, in the Novel Objects and 50-50 Hybrids tasks, we anticipated that securely attached children would endorse the mother's claim more often than that of a stranger. By contrast, in the 75-25 Hybrids task, when the object's perceptual appearance conflicts with the claim made by the mother, securely attached children were predicted to have confidence in their own perceptual judgment. Thus, if the mother refers to a hybrid creature as a dog but a stranger refers to it as a cat and the creature looks more like cat, secure children should endorse the claim made by the stranger.

Given their avoidance of interaction with a caregiver, we hypothesized that children with insecure-avoidant attachments would display less reliance on the mother than would secure children. More specifically, we predicted that insecure-avoidant children would not favor the claims made by the mother as compared to those of a stranger even when the available perceptual cues were equally consistent with both (as in the Novel Objects and 50-50 Hybrids tasks). Because of their relatively autonomous exploration of the environment, we further predicted that they would tend to favor the claims of the stranger over those of the mother when those claims were in line with most of the available perceptual evidence as in the 75-25 Hybrids task.

Given their vigilant monitoring of a caregiver, we expected that insecure-resistant children would display more reliance on the mother than would secure children. Thus, we predicted that resistant children would not endorse the claims made by a stranger even when those claims were more consistent with knowledge gained from their own perceptual observation than those of their mother (as in the 75-25 Hybrids task).

Predicting the performance of children in the final insecure category – insecure-disorganized (Main & Solomon, 1986; 1990) – was more difficult. In infancy, various types of disoriented behavior when interacting with the caregiver (e.g., freezing, stereotypical movements, signs of dissociation) are markers of disorganized attachment. This disorganization is hypothesized to arise from the infant's sense of "fright without solution" in response to atypical or maladaptive caregiving: the caregiver should be the child's secure base, and yet the caregiver's behavior induces fear and confusion in the child (Main & Hesse, 1990). Accordingly, we tentatively predicted that children in the insecure-disorganized group would demonstrate a pattern of behavior similar to that

hypothesized for the insecure-avoidant infants, displaying no systematic trust in the information provided by their mothers even in the Novel Objects and 50-50 Hybrids tasks.

As an additional check on the central role of attachment status in moderating children's pattern of trust, we also examined the predictive value of children's receptive language ability as indexed by scores on the British Picture Vocabulary Scale (BPVS; Dunn, Dunn, Whetton, & Burley, 1997) and their socio-economic status as scored on the Hollingshead Index (Hollingshead, 1975).

Method

Participants

One hundred forty-seven preschoolers (76 girls) and their mothers participated in this study when children were 4 years ($M = 50$ months, $SD = 1$ month) and 5 years ($M = 61$ months, $SD = 1$ month) of age. Although a total of 161 mother-child dyads were included in the sample at 50 months, 14 dyads were not tested at both time-points (due to schedule conflicts, subject attrition, etc.) and therefore were not included in the present analysis. Most children (141) were White. Hollingshead Index scores (SES; Hollingshead, 1975), where high scores reflect higher socio-economic status and lower scores reflect unemployment or more menial job status, indicated that a wide socioeconomic range was represented ($M = 37$, range: 14–66). Children participated with the consent of their caregiver. Participants were part of a larger ($N = 206$) longitudinal study in which children were seen at six time points (8, 15, 26, 44, 50, and 61 months).

Infant-Mother Attachment Security

Infant–mother attachment security was assessed using the Strange Situation procedure (Ainsworth et al., 1978) at 15 months ($M = 15.5$ months, $SD = 0.6$, range 13.7 – 17.3 months). A trained, reliable researcher who was blind to all other measures classified all strange situations. A second blind, reliable researcher coded a randomly selected 25% of strange situations and inter-rater reliability was $\kappa = 0.82$. The attachment distribution for the sample of 147 children was as follows: 96 secure, 26 insecure-avoidant, 9 insecure-resistant, and 16 insecure-disorganized.

Receptive Language Ability

One hundred forty-four children (74 girls) completed the British Picture Vocabulary Scale (BPVS; Dunn et al., 1997) at Time 1 and received a standardized score ($M = 103.8$, $SD = 12.96$, range 43 – 132). Three children were not administered the BPVS because of scheduling difficulties.

Selective Trust

At 50 months, children were tested on a Novel Objects task involving two conditions: Object Label and Object Function. In previous research, we have not found any systematic differences between these conditions (Corriveau & Harris, in press, b; Koenig & Harris, 2005). Accordingly, given that our primary interest was in probing individual differences across children, all participants received the Object Label condition followed by the Object Function condition. In both conditions, the child and the interviewer sat on one side of a table facing the child's mother and the stranger, who was an unfamiliar female experimenter from the research team. Each trial began with the interviewer placing a novel object on the table (e.g., a green rubber toilet flapper, a gold

and red metallic sprinkler head; see Table 1 for a full list of objects). The order of trials was maintained across participants, as shown in Table 1.

To introduce the task, the interviewer pointed to the two women seated across from the child and said, "Do you know who this is? That's right, that's Mummy. And do you know who this person is? That's (stranger's name)." No child ever claimed to know the stranger. To ensure that children remembered her name, children were asked to repeat it. The interviewer continued, "They're going to show you some things and tell you what they are called. I want you to listen very carefully and then I'm going to ask you some questions. Let's watch."

In both the Object Label and Object Function conditions, children were asked two types of test questions: *Ask* and *Endorse* questions. These were presented in a fixed order for pragmatic reasons. First, for *Ask* questions, children were presented with an object and asked, "Do you know what this is called (what this is for)?" Children were given a chance to reply and then were asked, "I expect one of these people can help us find out. Which person would you like to ask, Mummy or (name of stranger)?" Children could respond verbally (i.e., by saying the name of the informant) or non-verbally (i.e., by pointing). Children who claimed to know the name or function of the novel object were told, "Actually, I don't think that's what it is called (what it is for). I expect one of these people can help us find out. Which person would you like to ask, Mummy or (name of stranger)?" The order of mention of the two potential informants was systematically varied across trials.

Immediately following the *Ask* question, the interviewer turned to one of the two informants and asked, "Can you tell me what this is called (what this is for)?" In the

Object Label condition, the first informant responded by producing a novel label (e.g., “That’s a *snegg*”) and the same question was posed to the second informant, who produced a different novel label (e.g., “That’s a *yoona*.”). In the Object Function condition, the first informant responded by saying, “That’s for this”, and pantomiming a novel function. The same question was posed to the second informant, who pantomimed a different novel function. The order in which the two informants were asked questions was fixed and alternated across the four trials. On trials when the informant indicated by the child was not the first responder, the experimenter said before turning to the first responder (e.g., the stranger): “Oh you want to ask Mummy – let’s just ask (stranger’s name) first, shall we?” This comment was made to avoid any implication that the child’s request for information from a given informant (typically the mother) was being ignored.

The four *Endorse* questions occurred after watching the two informants name the object or pantomime its function. The interviewer asked children what they thought the object was called (used for). For example, in the Object Label trials, the experimenter said, “Mummy said it’s a *snegg* and (name of stranger) said it’s a *yoona*. What do you think it’s called, a *snegg* or a *yoona*?” Children gave either a verbal (“what Mummy said”, “a *snegg*”) or a nonverbal (pointing) response. Children received a point whenever they selected the mother in response to each *Ask* and *Endorse* question, for a maximum total of 8 points for both the object label and object function conditions.

At 61 months, children participated in two tasks involving hybrid animals. In the 50-50 Hybrids task, children viewed hybrid pictures with features looking 50% like one animal/object and 50% like another animal/object (see Figure 1 for an example and Table 1 for a full list of 50-50 Hybrids pictures). In the 75-25 Hybrids task, children viewed

hybrid pictures with features looking 75% like one animal/object and 25% like another animal/object (see Figure 2 for an example and Table 1 for a full list of 75-25 Hybrids pictures). These hybrid pictures were computer generated and were taken from the database created by Jaswal (2004). His research has confirmed that 2- to 5-year-olds identify these hybrids according to the majority of their perceptual features (Jaswal, 2004, 2006; Jaswal & Markman, 2007). As at 50 months, the child and the interviewer sat on one side of a table facing the child's mother and an unfamiliar experimenter who served as the stranger. Each trial began with the interviewer showing a picture to the participants. The order of trials was maintained across participants, as shown in Table 1.

The testing procedure was similar to the 50-month procedure. The interviewer first pointed to both of the women and asked the child to identify them. In both tasks, children were asked an *Ask* and *Endorse* question. In the *Ask* question, children were shown an object and were asked, "Which person would you like to ask what this picture is called, Mummy or (name of stranger)?" Children sometimes replied to this invitation by volunteering the name of the hybrid themselves. Thus, twenty-five children (3 insecure-avoidant, 18 secure, 1 insecure-resistant, 3 insecure-disorganized) claimed to know the name of at least 1 picture. These children were told, "I'm not sure. Let's see what they say. Which person would you like to ask, Mummy or (name of stranger)?" The order of mention was systematically varied across trials. Immediately following the *Ask* question, the interviewer turned to one of the two informants and asked, "Can you tell me what this is called?"

In the 50-50 Hybrids task, the first informant responded by producing one potential label (e.g., "That's a cow") and the second informant produced the other

feasible label (e.g., "That's a horse"). The labels used by the two informants varied by child. In the 75-25 Hybrids task, the mother responded by producing the less likely label and the stranger gave the more likely label. For each task, the order in which the two informants were asked questions alternated across the four trials.

The four *Endorse* questions occurred after children had watched the two informants label the picture. The interviewer asked children what they thought the animal/object in the picture was called. For example, in the 50-50 Hybrids trials, the experimenter said, "Mummy said it's a *cow* and (name of stranger) said it's a *horse*. What do you think it's called, a *cow* or a *horse*?" Children gave either a verbal ("what Mummy said", "a *cow*") or a nonverbal (pointing) response. Children received a point whenever they selected the mother in response to each *Ask* and *Endorse* question, for a maximum total of 8 points for the 50-50 Hybrids and 75-25 Hybrids tasks. All children chose the name supplied by either their mother or the stranger so that there were no missing data. Thus, no child said "neither" or combined labels.

At both 50 and 61 months, trials were videotaped and coded by a researcher blind to the hypotheses of the study as well as to the attachment security of the individual children. Because the words and pantomimes were novel at 50 months and trials were live, mothers sometimes failed to abide by the designated script. For this reason, at 50 months, 45 trials were removed by the first author, who was also blind to children's attachment security. These trials were removed on object label trials when the mother mispronounced the label and then asked, "Did I say this right" or stated, "I don't know how to say this." On object function trials, the mother occasionally said, "I don't know how to do this" or "I don't think I'm doing this correctly." No more than 2 trials were

removed for any given mother. When a trial was removed, the mean of the particular attachment group was used as a replacement, in order not to have missing data points. No trials required removal at 61 months due to the fact that mothers labeled pictures with familiar names. Thus, out of a total of 4960 trials, less than 1% needed replacement.

Results

For each of the three tasks (Novel Objects, 50-50 Hybrids, 75-25 Hybrids), children were scored for the proportion of trials on which they chose to *ask* the mother for information and similarly for the proportion of trials on which they *endorsed* the name provided by the mother. Table 2 shows these proportional scores as a function of task, type of question, and attachment security. For the Novel Objects task at 50 months, preliminary analysis revealed that children performed similarly with respect to both object names and object functions. Accordingly, the proportional scores were calculated with object name trials and object function trials combined.

Inspection of the total scores in Table 2 indicates that children generally chose to ask and endorse the mother less often when faced with 75-25 Hybrids as compared to either 50-50 Hybrids or Novel Objects. Nevertheless, children's overall reliance on their mother varied by attachment group. Reliance on the mother was strongest for all three tasks among resistant children and weakest for all three tasks among avoidant children. To check these conclusions, the proportional scores were analyzed by means of a $4 \times 3 \times 2$ ANOVA of Attachment Group, Task (Novel Objects, 50-50 Hybrids, 75-25 Hybrids), and Question (Ask, Endorse), with repeated measures on the last two factors. This analysis produced significant main effects of Attachment Group, $F(3, 143) = 6.70, p <$

.001, $\eta^2 = .12$, and Task, $F(2, 286) = 15.68, p < .001, \eta^2 = .10$. No significant main effect of Question and no interactions were found.

Post-hoc Tukey HSD tests confirmed that avoidant children selected the mother less often than secure children ($p < .001$), who, in turn, selected the mother less often than resistant children ($p < .05$). Insecure-disorganized children displayed no difference in selection of the mother as compared to avoidant children or secure children but they selected the mother less often than resistant children ($p < .05$).

Further analysis of the main effect of task confirmed that the mother was selected less often in the 75-25 Hybrids as compared to both the 50-50 Hybrids task ($p < .001$) and the Novel Objects task ($p < .001$). No difference was found for selection of the mother in the Novel Objects task as compared to the 50-50 Hybrids task.

To explore whether children's receptive vocabulary ability or socioeconomic status affected preference for the mother, the above 3-way analysis of Attachment Group, Task, and Question type was repeated with BPVS standardized scores and Hollingshead SES scores added as covariates. We found no significant main effects of either covariate ($F_s < 2.90$, n.s.) and retained the main effects of Attachment group, $F(3, 136) = 7.57, p < .001, \eta^2 = .15$, and Task, $F(2, 272) = 17.89, p < .001, \eta^2 = .22$, found in the initial ANOVA.

To further understand the pattern of trust shown by the four attachment groups, the proportion of times that the child chose their mother (collapsed across ask and endorse questions) was calculated for each of the 12 combinations of Attachment Group and Task. These proportional scores were compared to chance as shown in Figure 3. Inspection of Figure 3 reveals that insecure-avoidant children systematically rejected

information from the mother in the 75-25 Hybrids task. In addition, they showed no systematic preference for her in either the Novel Objects task or the 50-50 Hybrids task. Secure children displayed more reliance on the mother. Although, like insecure-avoidant children, they rejected information from her in the 75-25 Hybrids task, they systematically accepted information from her in both the Novel Objects task and the 50-50 Hybrids task. Insecure-resistant children showed no systematic preference for either informant in the 75-25 Hybrids task, but resembled secure children in the Novel Objects and 50-50 Hybrids task, preferring information from the mother. Finally, disorganized children responded systematically only in the Novel Objects task where they showed a preference for the mother.

To examine temporal relations in children's preference for the information provided by the mother, we conducted simple correlations for each of the four attachment groups between their preference for the mother in the Novel Objects task at 50 months and preference for the mother in each of the two Hybrids tasks at 61 months. We found a significant correlation between preference for the mother on the Novel Objects task at 50 months and performance on the 50-50 Hybrids task for children in the avoidant, $r(25) = .38, p = .05$ and secure, $r(95) = .27, p < .01$, groups, but not for those in the resistant, $r(8) = -.06$, n.s., or disorganized, $r(15) = .14$, n.s., groups. The correlation between performance on the Novel Objects task at 50 months and performance on the 75-25 Hybrids task at 61 months was nonsignificant for all four attachment groups: $r_s < .24$, n.s.

Discussion

In the introduction, we set out two expectations. We anticipated that children's willingness to seek out and accept claims made by their mother as compared to a stranger

would depend on the degree to which the mother's claims conflicted with available perceptual information. Second, we anticipated that children would weigh maternal and perceptual input differently depending on the security of the mother-child attachment relationship in infancy.

The results support – and help to refine – each of these two expectations. Considered as a single group, children were likely to ask for and endorse the information supplied by the mother when they were presented either with novel objects that offered no perceptual cues regarding their name or function, or with hybrid creatures falling equally into two different categories. Thus, when the available perceptual input did not help to adjudicate between the claims of the two informants, children tended to favor their mother. Children were less likely to trust the mother's claims if the object appeared to be consistent – with respect to the majority of its perceptual features – with the stranger's claim. This overall effect of task did not interact with attachment security. Moreover, once children's BPVS scores were included as a covariate the effect size for task proved to be large rather than moderate (Cohen, 1987).

Nevertheless, children's reliance on their mother's claims varied depending on the type of attachment relationship they had with her in infancy. Indeed, once children's BPVS scores were included as a covariate the effect size for attachment also proved to be large rather than moderate. Children's reliance on their mother might vary in a dichotomous fashion, depending on whether they have either a secure or an insecure relationship. Indeed, attachment research has often focused on the simple contrast between secure and insecure children (Fraley & Spieker, 2003). However, reliance on the mother might also vary within the two organized insecure groups, being weaker among

avoidant as compared to resistant children. The pattern of results offers strong support for this latter outcome. Avoidant and resistant children were not only different from secure children in their degree of reliance on the mother, but also markedly different from one another. Irrespective of task, avoidant children displayed the least reliance on their mother; secure children displayed a moderate – and flexible – pattern of reliance; and resistant children displayed the greatest reliance. Next, we consider in more detail how these different degrees of reliance on the mother played out across the three tasks.

Avoidant children – who displayed the least reliance on the mother's claims – never systematically favored her claims as compared to those of a stranger in either the Novel Objects task or the 50-50 Hybrids task. Moreover, they systematically rejected her claims in the 75-25 Hybrids task and endorsed those of the stranger. Secure children displayed a mix of trust and autonomy with respect to the mother's claims. They accepted her claims in both the Novel Objects and the 50-50 Hybrids task. Nevertheless, like avoidant children, secure children rejected the mother's claims in the 75-25 Hybrids task. Resistant children displayed the greatest reliance on the mother's claims. Like secure children, they preferred her claims in both the Novel Objects task and the 50-50 Hybrids task. However, unlike avoidant and secure children, resistant children did not systematically reject the mother's claims in the 75-25 Hybrids task even though the available perceptual evidence was mainly consistent with the stranger's claims. Of the four groups, children with a disorganized attachment were the least systematic in their pattern of responding. They displayed a significant but weak preference for the mother in the Novel Objects task, but no significant preference in the other two tasks.

In interpreting these findings, it is important to stress that although the overall sample was relatively large ($N = 147$), only a small number of children ($n = 9$) were classified as insecure-resistant. Accordingly, care is appropriate in interpreting the results obtained from this group of children. That said, the consistent findings for this group are reassuring. Despite the small size of this sub-sample, their preference for the mother was highly systematic in the Novel Objects task at 50 months and also in the 50-50 Hybrids task at 61 months. Note that each of these results contrasts with the indiscriminate behavior shown by insecure-avoidant children on each of these two tasks.

Additional support for the claim that children's attachment status influences their reliance on the mother emerged from the correlational analyses which indicated stable levels of reliance on the mother over a period of approximately 1 year, particularly in the absence of clear-cut perceptual cues favoring one informant over the other. Thus, for both secure and insecure-avoidant children, reliance on the mother at 50 months on the Novel Objects task was correlated with reliance on the mother at 61 months on the 50-50 Hybrids task (but not with reliance on the mother in the 75-25 Hybrids task, when the perceptual cues favored the stranger's claims). The expected correlation between the Novel Objects task and the 50-50 Hybrids task was not found for insecure-resistant or disorganized children. However, it is important to recall that there were only 9 insecure-resistant children and 16 disorganized children. The apparent lack of stability in these two groups should be treated with caution given the relatively small number of children in each.

In light of the findings from attachment theory reviewed in the introduction, we may say that, in gathering information, insecure-avoidant children favor a strategy of

self-reliance – they accept information from an informant that is consistent with their own autonomous observation. By contrast, insecure-resistant children prefer to rely on a familiar caregiver. Secure children display more flexibility, sometimes adopting a self-reliant strategy and sometimes relying on a familiar caregiver. Consistent with their persistent instability from infancy through the preschool years, disorganized children showed the least consistency in their responses.

To the extent that attachment status is frequently associated with other characteristics of both the mother and the child, it is appropriate to be cautious in proposing that attachment status has a direct impact on the degree to which children rely on information supplied by the mother. However, confidence in the key role of attachment was strengthened by the finding that an essentially similar pattern of findings emerged when characteristics of the mother (SES) as well as the child (receptive vocabulary) were included as covariates. That said, it is important for future research to investigate in greater detail whether other characteristics of the child might mediate or moderate the observed relation between attachment security and children's reliance on their mothers' claims. For example, separate assessments of temperamental characteristics relating to ego strength, self-confidence, and self-reliance should be taken in order to establish how far early attachment security independently predicts children's tendency to endorse the mother's claims as a function of her perceived accuracy. In addition, it will be informative to examine whether children's reliance on their mother's claims is best conceptualized in terms of the categorical approach favored by most attachment theorists or in terms of continuous measures (Fraley & Spieker, 2003). It is conceivable that a continuous measure gathered during the Strange Situation might prove

a strong predictor of children's reliance on the mother. For example, contact maintenance – which tends to be weak among avoidant children, intermediate among secure children and strong among resistant children – might display a clear, linear relationship to reliance on their mother. Such a relationship would be consistent with the hypothesis that children vary continuously in the extent to which they monitor their mother's signals, with some children relying on their own perceptual observations, others displaying hyper-vigilance toward their mother's signals and an intermediate group shifting between these two strategies depending on the perceptual evidence available.

In conclusion, we may consider two broader theoretical issues. First, it could be argued that differences in reliance on the mother's signals might be attributable to differences in the way that signals are transmitted between mother and child. For example, children who rely more on their mother's claims may be especially attentive to her. Conversely, mothers who elicit greater reliance on their claims may be especially likely to express those claims in a confident or convincing fashion. The current findings cannot rule out these signal-based interpretations. However, two observations suggest that they do not offer a fully adequate explanation for the pattern of findings observed. First, recall that the experimenter repeated the claims made by the Mother and the Stranger when posing questions, thereby undercutting or overriding possible differences between the two informants in the attention that they elicited or in the confidence that they conveyed. Second, the selective behavior observed in the present study is only one manifestation of a broader pattern of selectivity displayed by preschoolers. For example, 3- and 4-year-olds prefer accurate to inaccurate informants (Corriveau & Harris, in press, b) as well as informants who elicit nonverbal assent rather than dissent from bystanders

(Fusaro & Harris, 2008). Children's use of a variety of strategies for choosing among informants suggests that their reliance on particular informants can be plausibly attributed to a wide-ranging and deep-seated psychological mechanism rather than to overtly observable differences in patterns of attention or expression.

The second issue concerns the particular contexts in which children will rely on information supplied by their mother. As discussed in the introduction, attachment theorists have emphasized that children turn to the mother for reassurance in the context of threat or emotional uncertainty. Our results suggest, however, that this conception of an attachment figure as a source of emotional reassurance may underestimate her influence. Even when the attachment system is not obviously activated, and children are simply unsure about the available evidence, the present results suggest that children prefer information from their mother rather than a stranger, and the strength of that preference is moderated by their attachment status. Based on these findings, it is plausible that children will favor their mothers' claims in other domains where, although they have no urgent need for emotional reassurance, decisive perceptual evidence is not available for them to come to firm conclusions on their own.

Consider, for example, the mental states or the personality traits of an unfamiliar person. Unequivocal cues may not be immediately available to indicate how kind or smart that person is. Accordingly, in deciding what states or traits to expect, children may turn for guidance to a familiar caregiver such as the mother. Similarly, in anticipating what will happen in the future, young children will often have no unequivocal cues indicating what they should expect. In such circumstances, they are again likely to seek out and be receptive to testimony provided by a familiar caregiver. Although such

information might be especially sought out and trusted when the future event is threatening or anxiety provoking (e.g., a visit to the dentist), it is feasible that a familiar caregiver will also be a preferred source when children gather information about upcoming neutral or benign events (e.g., a visit to the store or to the zoo).

From the pattern of results that emerged in the present study, we can predict that reliance on the mother's claims about these equivocal states, traits, and future events will be strongest among insecure-resistant children and weakest among insecure-avoidant children. Indeed, even when there is obvious counter-evidence, insecure-resistant children may continue to endorse the information supplied by their mother whereas, even in the absence of such counter-evidence, insecure-avoidant children may hesitate to accept it.

References

- Ainsworth, M. D. S (1992). A consideration of social referencing in the context of attachment theory and research. In. S. Feinman (Ed.), *Social referencing and the social construction of reality in infancy* (pp. 349-367). New York: Plenum Press.
- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Hillsdale, NJ: Erlbaum.
- Baldwin, D.A. & Moses, L.J. (1996). The ontogeny of social information gathering. *Child Development*, 67, 1915-1939.
- Bretherton, I., Ridgeway, D., & Cassidy, J. (1990). Assessing internal working models of the attachment relationship: An attachment story completion task for 3-year-olds. In M. Greenberg, D. Cicchetti & E.M. Cummings (Eds.), *Attachment in the preschool years: Theory, research and intervention* (pp. 273-308). Chicago: Chicago University Press.
- Cohen, J. (1987). *Statistical power analysis for the Behavioral Sciences*. Lawrence Erlbaum Associates: Hillsdale, N.J.
- Corriveau, K. H., & Harris, P. L. (in press, a). Choosing your informant: Weighing familiarity and past accuracy. *Developmental Science*.
- Corriveau, K.H. & Harris, P.L. (in press, b). Preschoolers continue to trust a more accurate informant 1 week after exposure to accuracy information. *Developmental Science*.
- Dunn, L. M., Dunn, L. M., Whetton, C., & Burley, J. (1997). *British Picture Vocabulary Scales* (second edition). Windsor: NFER Nelson.

- Feinman, S. (1992). *Social referencing and the social construction of reality in infancy*. New York: Plenum Press.
- Fonagy, P., Gergely, G., & Target, M. (2007). The parent–infant dyad and the construction of the subjective self. *Journal of Child Psychology and Psychiatry*, 48, 288-328.
- Fraley, R.C. & Spieker, S.J. (2003). Are infant attachment patterns continuously or categorically distributed? A taxometric analysis of Strange Situation behavior. *Developmental Psychology*, 39, 387-404.
- Fusaro, M. & Harris, P.L. (2008). Children assess informant reliability using bystanders' non-verbal cues. *Developmental Science*, 11, 781-787.
- Green, J., Stanley, C., Smith, V., & Goldwyn, R. (2000). A new method of evaluating attachment representations in young school-age children: The Manchester Child Attachment Story Task. *Attachment and Human Development*, 2, 48-70.
- Harris, P.L. & Koenig, M. (2006). Trust in testimony: How children learn about science and religion. *Child Development*, 77, 505-524.
- Hollingshead, A. B. (1975). *Four Factor Index of Social Status*. New Haven, CT: Author.
- Jaswal, V. K. (2004). Don't believe everything you hear: Preschoolers' sensitivity to speaker intent in category induction. *Child Development*, 75, 1871-1885.
- Jaswal, V. K. (2006). Preschoolers favor the creator's label when reasoning about an artifact's function. *Cognition*, 99, B83-B92.
- Jaswal, V. K., & Markman, E. M. (2007). Looks aren't everything: 24-month-olds willingness to accept unexpected labels. *Journal of Cognition and Development*, 8, 93-111.

- Koenig, M., & Harris, P. L. (2005). Preschoolers mistrust ignorant and inaccurate speakers. *Child Development*, 76, 1261-1277.
- Lütkenhaus, P., Grossmann, K. E., & Grossmann, K. (1985). Infant-mother attachment at twelve months and style of interaction with a stranger at the age of three years. *Child Development*, 56, 1538-1542.
- Main, M., & Hesse, E. (1990). Parents' unresolved traumatic experiences are related to infant disorganized attachment status: Is frightened and/or frightening parental behavior the linking mechanism? In M. Greenberg, D. Cicchetti & E.M. Cummings (Eds.), *Attachment in the preschool years: Theory, research and intervention* (pp. 161-182). Chicago: Chicago University Press.
- Main, M., & Solomon, J. (1986). Discovery of an insecure-disorganized/disoriented attachment pattern. In T. B. Brazelton & M. W. Yogman (Eds.), *Affective development in infancy*, pp. 95-124. Westport, CT: Ablex Publishing.
- Main, M., & Solomon, J. (1990). Procedures for identifying infants as disorganized/disoriented during the Ainsworth strange situation. In M. Greenberg, D. Cicchetti & E.M. Cummings (Eds.), *Attachment in the preschool years: Theory, research and intervention* (pp. 121-160). Chicago: Chicago University Press.
- Meins, E. (1997). Security of attachment and maternal tutoring strategies: Interaction within the zone of proximal development. *British Journal of Developmental Psychology*, 15, 129-144.

- Meins, E., Fernyhough, C., Fradley, E., & Tuckey, M. (2001). Rethinking maternal sensitivity: Mothers' comments on infants' mental processes predict security of attachment. *Journal of Child Psychology and Psychiatry*, 42, 637-648.
- Olson, K.R. & Dweck, C.S. (2008). A blueprint for social cognitive development. *Perspectives on Psychological Science*, 3, 193-202.
- Pasquini, E. S., Corriveau, K., Koenig, M., & Harris, P. L. (2007). Preschoolers monitor the relative accuracy of informants. *Developmental Psychology*, 43, 1216-1226.
- Piaget, J. (1952). *The origins of intelligence in children*. New York: International University Press.
- Piaget, J. (1954). *The construction of reality in the child*. New York: Basic books.
- Repacholi, B.M. & Meltzoff, A.N. (2007). Emotional eavesdropping: Infants selectively respond to indirect emotional signals. *Child Development*, 78, 503-521.
- Sabbagh, M. & Baldwin, D.A. (2001). Learning words from knowledgeable versus ignorant speakers: Links between preschoolers' theory of mind and semantic development. *Child Development*, 72, 1054-1070.
- Sorce, J.F., Emde, R.N., Campos, J.J., & Klinnert, M.D. Maternal emotional signaling: its effects on the visual cliff behavior of 1-year-olds. *Developmental Psychology*, 21, 195-200.
- Sroufe, L. A., Egeland, B., Carlson, E. A., & Collins, W. A. (2005). *The development of the person*. New York: Guilford Press.
- Tamis-LeMonda, Adolph, K.E., Lobo, S.A., Karasik, L.B., Ishak, S. & Dimitropoulou, K.A. (2008). When infants take mothers' advice: 18-month-olds integrate

perceptual and social information to guide motor action. *Developmental Psychology*, 44, 734-746.

Zarbatany, L. & Lamb, M.E. (1985). Social referencing as a function of information source: Mothers versus strangers. *Infant Behavior and Development*, 8, 25-33.

Table 1

Stimuli and informant labels (or functions) for novel objects task, 50-50 hybrids task and 75-25 hybrids task

	Stimuli	Mother	Stranger
Novel Objects (Labels)	Grey rubber squeegee	"That's a snegg"	"That's a hoon"
	Blue toilet flapper	"That's a yiff"	"That's a zazz"
	Metal cocktail pourer	"That's a crut"	"That's a larp"
	Metal bathroom hook	"That's a linz"	"That's a slod"
Novel Objects (Functions)	Yellow plastic sprinkler	Look through like	Hold up to
	attachment	a telescope	mouth and blow
	Wooden orange juicer	Roll on table	Hammer on
			table
	Black and grey knee pad	Snap like a slingshot	Use as a hat
50-50 Hybrids	Black toilet plunger	Spin like a top	Squish together
	Bear-Pig	Bear	Pig
	Key-Spoon	Key	Spoon
	Cow-Horse	Cow	Horse
75-25 Hybrids	Ball-Button	Ball	Button
	Pen-Brush	Pen	Brush
	Bird-Fish	Bird	Fish
	Squirrel-Rabbit	Squirrel	Rabbit
	Shoe-Car	Shoe	Car

Table 2

Proportion of trials on which children chose their mother by task, attachment group, and question

Question	Avoidant (n = 26)	Secure (n = 98)	Resistant (n = 9)	Disorganized (n = 16)
Condition 1: Novel Objects				
Ask	.59 (.31)	.71 (.26)	.74 (.23)	.63 (.26)
Endorse	.57 (.28)	.63 (.27)	.75 (.29)	.62 (.24)
Condition 2: 50-50 Pictures				
Ask	.52 (.24)	.66 (.21)	.64 (.18)	.56 (.21)
Endorse	.43 (.34)	.63 (.26)	.81 (.24)	.48 (.28)
Condition 3: 75-25 Pictures				
Ask	.32 (.20)	.48 (.27)	.64 (.22)	.56 (.28)
Endorse	.48 (.27)	.40 (.27)	.53 (.29)	.48 (.25)
Total				
Novel Objects	.58 (.26)	.67 (.24)	.74 (.20)	.63 (.20)
50-50 Pictures	.47 (.22)	.64 (.19)	.72 (.08)	.52 (.18)
75-25 Pictures	.34 (.18)	.44 (.22)	.58 (.24)	.52 (.24)

Figure 1. Examples of 50-50 Hybrids (Cow-Horse and Bear-Pig)

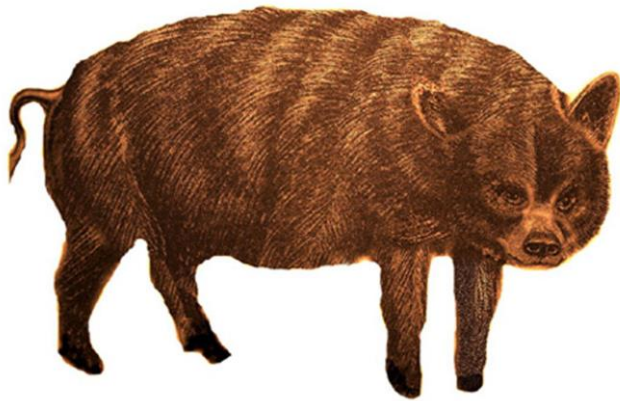
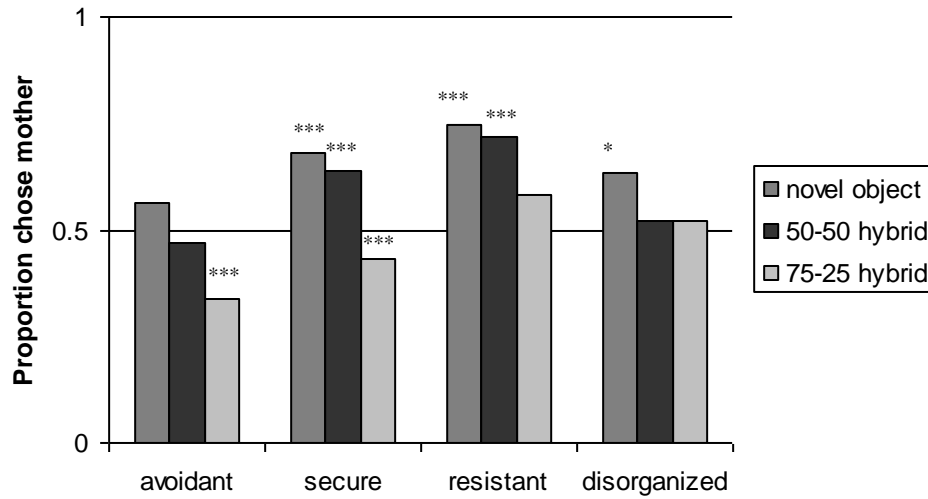


Figure 2. Examples of 75-25 Hybrids (Bird-Fish and Rabbit-Squirrel)



Figure 3. Proportion of trials on which children chose their mother by task and attachment group compared to chance performance.



* $<.05$ *** $<.001$